

**AMENDMENTS TO THE CLAIMS**

1-22. (Canceled)

23. (Currently Amended) A method of determining an optimum recording power based on a relation ship between modulation parameters and recording powers which are provided through a test writing in which writing a pattern of marks and spaces to an optional storage medium with a recording power p is related by sequentially changing the recording power p with increments of a predetermined power, a test reading in which reading the pattern from the storage medium is repeated so that data signals are reproduced from the respective patterns on the storage medium, and a calculation of a modulation parameter m for each of the reproduced data signals, each modulation parameter m corresponding to one of the respective recording powers p, the method comprising the steps of:

selecting a sequence of pairs of the modulation parameter m and the corresponding recording power p from all of the modulation parameters and the recording powers;

calculating a gamma=( $\Delta m/m$ )/( $\Delta p/p$ ) for each of the selected pairs of the modulation parameter m and the recording power p, the gamma defining a ratio of a change of the modulation parameter m, normalized by a modulation

parameter value, to a change of the recording power p, normalized by a recording power value; and

finding a target recording power corresponding to the optimum recording power based on a function derived from a relationship between the calculated gammas and the respective recording power, the target recording power causing a value of the function to be equal to zero,

wherein a pair of the modulation parameter m and the recording power p is omitted in the selecting step if a value of the modulation parameter of the pair is not larger than a threshold value, and

wherein the threshold value used in the selecting step is set to a predetermined value in order to determine the optimum recording power without being affected by noise.

24. (Original) The method of claim 23 wherein the gamma is approximated to a continuous function of the recording power p, and the target recording power is determined on the continuous function of the recording power p.

25. The method of claim 23 wherein a target gamma value contained in the function is a known value that is specific to the optical storage medium.

26. (Original) The method of claim 23 wherein the target recording power is multiplied by a known constant specific to the optical storage medium, and the result of the multiplication is provided as being a value indicating the optimum recording power.

27. (Currently Amended) A method of determining an optimum recording power based on a relationship between modulation parameters and recording powers which are provided through a test writing in which writing a pattern of marks and spaces to an optical storage medium with a recording power  $p$  is repeated by sequentially changing the recording power  $p$  with increments of a predetermined power, a test reading in which reading the pattern from the storage medium is repeated so that data signals are reproduced from the respective patterns on the storage medium, and a calculation of a modulation parameter  $m$  for each of the reproduced data signals, each modulation parameter  $m$  corresponding to one of the respective recording powers  $p$ , the method comprising the steps of:

selecting a sequence of pairs of the modulation parameter  $m$  and the recording power  $p$  from all of the modulation parameters and the recording powers;

approximating the modulation parameter to a continuous function  $m(p)$  of the recording power  $p$  based on the selected pairs of the modulation parameter  $m$  and the recording power  $p$ ; and

finding a target recording power corresponding to the optimum recording power, based on a derivative function ( $dm/dp$ ) of the function  $m(p)$  with respect to the recording power  $p$ , the target recording power causing a value of  $(dm/dp) * (p/m)$  to be equal to a predetermined value,

wherein a pair of the modulation parameter  $m$  and the recording power  $p$  is omitted in the selecting step if a value of the modulation parameter of the pair is not larger than a threshold value, and

wherein the threshold value used in the selecting step is set to a predetermined value in order to determine the optimum recording power without being affected by noise.

28. (Original) The method of claim 27 wherein the target recording power is multiplied by a known constant specific to the optical storage medium, and the result of the multiplication is provided as being a value indicating the optimum recording power.

29. (Currently Amended) An optical recording/reproducing apparatus comprising:

a test writing unit performing a test writing in which writing a pattern of marks and spaces to an optical storage medium with a recording power  $p$  is repeated by sequentially changing the recording power  $p$  with increments of a predetermined power;

a test reading unit performing a test reading in which reading the pattern from the storage medium is repeated, so that data signals are reproduced from the respective patterns on the storage medium;

a calculation unit calculating a modulation parameter  $m$  for each of the reproduced data signals, each modulation parameter corresponding to one of the respective recording powers; and

a determination unit determining an optimum recording power based on a relationship between the modulation parameters and the respective recording powers,

wherein the determination unit comprises:

a selection unit selecting, from all of the modulation parameters and the recording powers, a sequence of pairs of the modulation parameter  $m$  and the recording power  $p$ ;

a gamma calculation unit calculating a  $\gamma = (\Delta m/m)/(\Delta p/p)$  for each of the selected pairs of the modulation parameter  $m$  and the recording power  $p$ , the gamma defining a ratio of a change of the modulation parameter  $m$ , normalized by a modulation parameter value, to a change of the recording power  $p$ , normalized by a recording power value; and

a target recording power unit finding a target recording power corresponding to the optimum recording power based on a function derived from a relationship between the calculated gammas and the respective recording powers, the target recording power causing a value of the function to be equal to zero,

wherein the selection unit omits a pair of the modulation parameter  $m$  and the recording power  $p$  if a value of the modulation parameter of the pair is not larger than a threshold value, and

wherein the threshold value used in the selection unit is set to a predetermined value in order to determine the optimum recording power without being affected by noise.

30. (Original) The optical recording/reproducing apparatus of claim 29 wherein the gamma is approximated to a continuous function of the recording power  $p$ , and the target recording power is determined on the continuous function of the recording power  $p$ .

31. (Original) The optical recording/reproducing apparatus of claim 29 wherein a target gamma value contained in the function is a known value that is specific to the optical storage medium.

32. (Original) The optical recording/reproducing apparatus of claim 29 wherein the target recording power is multiplied by a known constant specific to the optical storage medium, and the result of the multiplication is provided as being a value indicating the optimum recording power.

33. (Currently Amended) An optical recording/reproducing apparatus comprising:

a test writing unit performing a test writing in which writing a pattern of marks and spaces to an optical storage medium with a recording power  $p$  is repeated by sequentially changing the recording power  $p$  with increments of a predetermined power;

a test reading unit performing a test reading in which reading the pattern from the storage medium is repeated, so that data signals are reproduced from the respective patterns on the storage medium;

a calculation unit calculating a modulation parameter  $m$  for each of the reproduced data signals, each modulation parameter corresponding to one of the respective recording powers; and

a determination unit determining an optimum recording power based on a relationship between the modulation parameters and the respective recording powers,

wherein the determination unit comprises:

a selection unit selecting, from all of the modulation parameters and the recording powers, a sequence of pairs of the modulation parameter  $m$  and the recording power  $p$ ;

an approximation unit approximating the modulation parameter into a continuous function  $m(p)$  of the recording power  $p$  based on the selected ~~pairs~~ pairs of the modulation parameter [[me]]  $m$  and the recording power  $p$ ; and

a target recording power unit finding a target recording power corresponding to the optimum recording power, based on a derivative function ( $dm/dp$ ) of the function  $m(p)$  with respect to the recording power

p, the target recording power causing a value of  $(dm/dp) * (p/m)$  to be equal to a predetermined value,

wherein the selection unit omits a pair of the modulation parameter m and the recording power p if a value of the modulation parameter of the pair is not larger than a threshold value,and

wherein the threshold value used in the selection unit is set to a predetermined value in order to determine the optimum recording power without being affected by noise.

34. (Original) The optical recording/reproducing apparatus of claim 33 wherein the target recording power is multiplied by a known constant specific to the optical storage medium, and the result of the multiplication is provided as being a value indicating the optimum recording power.